Chapter 7

Conclusions and Scope for Future Work
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7.1. Conclusions

The conceptual and technological reviews strengthen two facts (i) there is a need for improvement in the area of integrated resource allocation and monitoring system and (ii) multi-agent systems are used to enhance decision-making capabilities. Hence, a prototype, Multi-agent System for Resource Allocation and Monitoring System (MASRAM), is designed, developed and verified using multi-agent technology with backend support of database as a part of research work. The system helps in bringing transparency, uniform policy and reducing process time in allocating funds.

The developed system helps users (fund seeker, fund allocator, reviewers and experts) to interact with Fund Seeker Agent (FSA) and Fund Allocator and Monitor Agent (FAMA) of MASRAM through graphical user interfaces provided by Facilitator Agent (FCA). The system has the capabilities to help fund seekers to know appropriate sources of funding, submit proposals and submit progress of the projects. FAMA agent of the system helps fund allocator in getting reviews on proposals, evaluating proposals against twelve decision-making factors, assigning weights, ranking the proposals, allocating the funds and monitoring the progress. The role of experts in deciding decision-making factors and weights helped in evaluating and ranking the project. The integrated technique of Fuzzy set, Analytic Hierarchy Process (AHP) and Multi-Criteria Decision-Making found satisfactory in setting weights of decision-making factors.

The design of the system is flexible enough to accommodate variations in fund categories of different fund allocators. The fund allocators provide the values for fixed parameters before fund allocation. The main problem in designing MASRAM was communication between agents. Ontology using database helped in establishing the communication between agents. Ontologies helped in making communication when agents interact directly. Database support helped agents to store the data permanently and fetch the same as and when required. The three-layered web-based architecture of MASRAM decomposed the system into three components made implementation manageable. The
presentation layer is implemented using JSP. The agent layer is implemented using JADE and database layer is implemented using Oracle. The system is verified for both individual and organization fund seekers and results found satisfactory.

The use of different tools like JADE and JSP were found extremely suitable for multi-agent based system development. Techniques like AHP and percentile method are required in developing multi-criteria decision-making systems like resource allocation.

7.2. Scope for Future Work

The future work can be either in enhancing the functional capabilities or the technical features or both of the system developed. MASRAM does relative comparisons of the proposals submitted while evaluating them. The scope for functional enhancement includes absolute comparison of the proposals submitted. This absolute comparison will help in customizing this tool for other fund allocation applications including loan disbursements and deciding insurance policy.

As the tool is developed for web-based environment, it should address all the web related security issues before it is made operational. The security issues include session management, cookies management, encryption/description, broken links, page validation etc. For better reporting, tools like iReport and JasperReport can be used instead of normal HTML format.